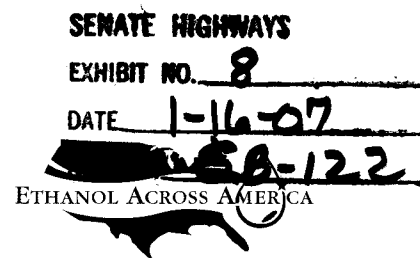


Issue Brief: Energy Security



Summer 2005

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Energy Security. We hear the term all the time, but what does it really mean? Do we mean national security? Well, sort of. Do we mean energy independence? Well sort of that, too. Do we mean economic security? Yes, all of the above.

"Energy security" is probably best understood when taken literally. We need to be secure in our energy in terms of the source, i.e. where it comes from, control of the flow and distribution of that energy, and having alternatives in place to allow us to withstand highs and lows associated with any commodity. Unfortunately, the United States is the antithesis of a secure energy nation. We depend on foreign oil to the extent that our economy is precariously over the barrel—and any number of global events, including peaceful competition for supply, could cripple us beyond any thing we have seen in our history.

U.S. gasoline consumption has grown to 140 billion gallons per year. Add to that a growing diesel fuel market of 45 billion gallons. Those gallons come from barrels, and most of those barrels come from countries other than ours. In fact, 55% of the total consumption of petroleum in the United States is imported. As recently as 1980 imports represented just 37%, but the Department of Energy estimates that by 2025 dependence will increase to nearly 70%. Obviously, we are headed in the wrong direction. And, it is going to get worse, perhaps much worse.

Part of our complacency during the 1980s and 1990s (when we truly let our habit get out of hand) was due to the simple fact that imported oil, and our gasoline, were dirt cheap—too cheap to warrant serious efforts to develop alternatives.

Some petroleum advocates argue that our supply of oil is not threatened because our suppliers need our money—and to get it the oil has to keep flowing. Out of the many flaws in that logic, there are two factors that go to the heart of the energy security debate. The first is to recognize exactly who we get that oil from, and where. The second is that our days of being the big volume buyer and ensuring a flow may be over. China, India, and a number of developing countries are going to rival our thirst for oil and at that point we may enter a new era of bidding for this imported, polluting, nonrenewable resource.

Where in the World is the Oil?

Well, it certainly isn't in the U.S. We consume 25% of the world's oil and have just three percent of the known reserves. That's like eating more than three times your own weight—a bit indulgent.

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Dear Friends:

Joining with my fellow Board Members on the Ethanol Across America campaign, I am pleased to bring to your attention the important issue of Energy Security.

For many years as a member and former Chairman of the U.S. Senate Agriculture Committee and now as Chairman of the Senate Foreign Relations Committee, I have argued that America's insatiable appetite for oil places our country in a precarious situation of reliability on regions of the world that have become increasingly hostile to us.

Increasing the development and production of renewable fuels such as ethanol will help ensure national and economic security and gas price stability. With high oil prices, ethanol production becomes ever more important, and farmers growing corn will add to our nation's security while helping our communities prosper.

I hope that this Issue Brief will increase your understanding about the benefits of biofuels.

Sincerely,

Richard Lugar
United States Senator

With regard to who does have it, another red herring the petroleum industry tosses around is to claim that our dependence on imports is not really a threat because we have diversified our sources. That's like saying that, after looking at your bruises in the mirror, you continue to hit yourself in the head with a hammer. But it's O.K.—you're using several smaller hammers.

True, we currently import more petroleum from Canada and Mexico than from Saudi Arabia and Iraq. U.S. imports of OPEC oil (Organization of Petroleum Exporting Countries) continues to be a whopping 43%, and 25% of that is from Persian Gulf countries. The flow from Canada and Mexico can reasonably be assured, so we have no problem, right? Even though we may be compliant enough to give these countries our money, that well may begin to run dry.

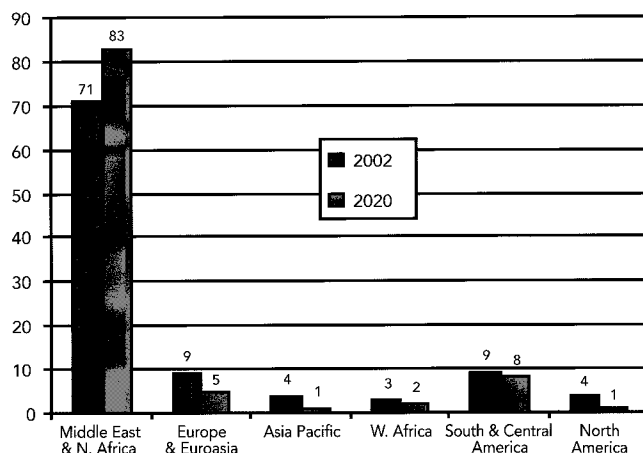
While the current supply is indeed spread out, the key to not repeating history is to look to the future

and where our reserves lie. That begins to tell a different story.

Of the known oil reserves in the world, a mere 6% percent are in North America. Not the U.S., not Canada, not Mexico—but all three countries combined. We are drawing down on those supplies at such a rate that that most experts believe that, at current rates of production, many of these countries outside the Middle East are at or past their peak—and will steadily decline over the next 15 years. With paltry reserve numbers scattered across the globe, where is all the oil the petroleum industry keeps telling us we have?

Saudi Arabia (25%), Iraq (11%), Iran (8%), United Arab Emirates (9%), Kuwait (4%), Libya (2%): Total from that U.S. friendly region is 66% of known global oil reserves. As the line of current sources of production going down crosses that of the aforementioned OPEC countries going up to fill the demand, the Middle East producers will again become the hub of the wheel. The need for military presence in that region to ensure the supply of oil will increase with the level of dependence and, as the Persian Gulf reasserts itself as the oil superpower, the U.S. may become an enabler by not only creating demand for the product, but also providing the support to ensure supply.

Share of Global Reserves Based on Current Production Rates



Source: Institute for the Analysis of Global Security

New Kids on the Block

A long term view of sources and demand could make our current situation something we long for ten years from now.

According to the International Energy Agency (IEA), world oil consumption will increase by 60% by the year 2020. That is a mere 15 years from now. Often referred to as the sleeping giant, China is fully awake and bursting onto the world oil scene in a big way.

From its recent effort to purchase Unocal Petroleum for \$18 billion to its astonishing increase in automobiles, China is going to be a major customer for OPEC. IEA estimates China will increase its petroleum consumption eightfold by 2030 and will have more cars than the United States.

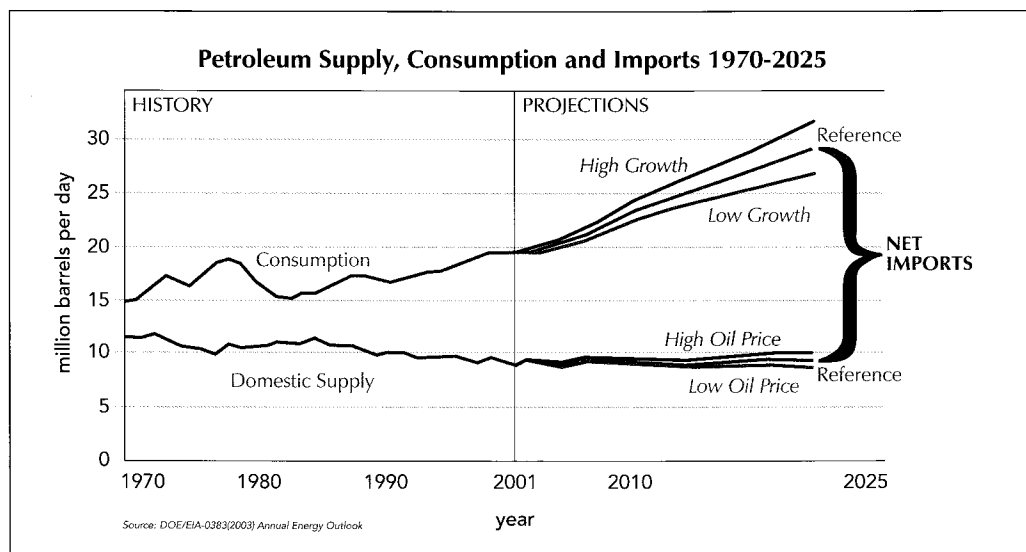
India, another giant lumbering into industrialized status, is right behind China's annual oil consumption increase of 7.5% per year with a projected 5.5%. Do we really want to get into a bidding war with Southeast Asia and its 35% of the world's population? These economies will be fueled by petroleum—they have little choice. They are constrained by technology, by capital, by infrastructure, and by vision. But we in the U.S. are not.

Who Picks Up the Check?

We do. The 30-year anniversary of the Iranian oil embargo came and went in 2003 and our response was to import more oil. We just don't seem to get it. There are several crippling aspects to this addiction to foreign oil. The sheer dependence on forces out of our control for so much of our energy is poor planning. It is hard to imagine an intelligent populace putting itself in such a position. Occasionally we are reminded when the slightest hiccup in the flow of oil immediately creates a shortage – real or perceived—that in turn immediately allows the petroleum industry to reach into the pockets of consumers. A pipeline malfunction in Russia, a pumping station mishap in Iran, an oil spill from a tanker—any of these can result in a shortage that affects the entire nation.

All driving Americans have become conditioned—because that is what we are told—to believe increased prices at the pump are due to factors out of our control. We mutter unprintables about big oil, mideastern sheiks, and others we choose to blame—and then go ahead and pay the increase. But what does 2 to 3 cents at the pump really mean in the context of a nation?

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Increased petroleum consumption, coupled with decreased U.S. production, means net imports will continue to rise. The more economic growth the U.S. enjoys, the more the import figure increases.

How about 20, 30, even 50 cents, which is more like what we have experienced over the recent months?

At \$60 per barrel of oil, and a daily importation of at least 10 million barrels,, hmm, let's see. Six times ten, carry the six.....The picture should be clear.

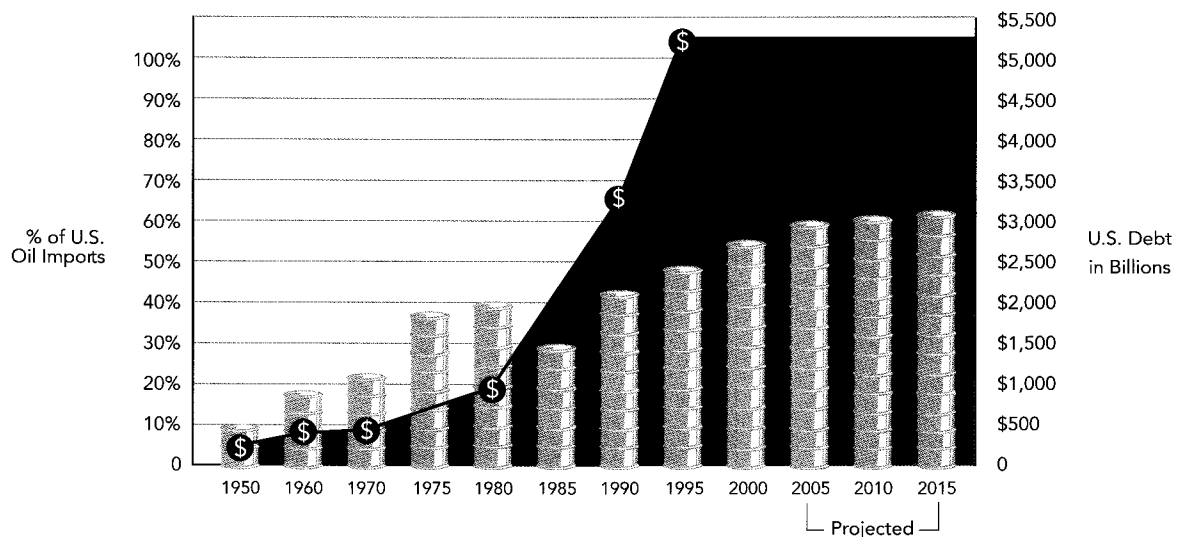
Even if oil drops to \$50 per barrel or less, it still represents a massive hemorrhage of U.S. dollars. There are the direct costs, like the 30 to 50 cents out of the pockets of our citizens. But there are also the hidden costs, ranging from cleanup of oil spills to the increased military presence in the Middle East. On the direct side, the increase of 50 cents per gallon on a multi-car family represents a net cost increase to them of anywhere from \$500 to \$1,000. At a 30% tax rate, they had to make \$1,300 to buy that fuel. That is money that might be used for any number of purposes, not the least of which is to regenerate their own community if

the fuel could be produced locally. That would mean the money is spent at the local hardware store, the dry cleaners, or the diner. But now that money is in the Persian Gulf.

From the standpoint of the big picture, the key link to this outflow of cash is the trade deficit. A trade deficit indicates that the United States imports more goods and services than it exports. Petroleum imports account for approximately 35% of America's current trade deficit. Some projections suggest that petroleum imports will rise to over 60 to 70% of the U.S. trade deficit in the next 10 to 20 years.

Based on annual increases, that may not be far off. In 1987, the United States trade deficit in crude oil was \$27 billion. In 1990, that figure nearly doubled to \$43.7 billion and by 1999 increased to \$59.2 billion. In 2002 the U.S. spent just under \$110 billion on foreign oil, representing a massive transfer of U.S. wealth to foreign countries. One reason for the increases in the trade deficit is the continued

Trends in Crude Oil Imports and the Budget Must Be Reversed



growth of the transportation sector, where 97% of our transportation fuel is derived from petroleum. The U.S. Department of Commerce estimates that for every billion dollars in trade deficit, the United States loses more than 19,000 jobs. In the last 10 years, the total of U.S. trade deficits has exceeded \$1 trillion. This persistent pattern has contributed significantly to declining real wages and to increasing job insecurity. Most of its victims are middle-income working people. It is estimated that the manufactured goods trade deficit represents a loss

Even if supply were not an issue—and it most certainly is—those who minimize the role of alternatives to oil such as ethanol presume we actually prefer to burn nonrenewable fossil fuels, from countries other than ours, and that we like sending \$100 billion out of the United States so others can have a better quality of life.

of some three million American jobs, according to the AFL-CIO Executive Council. In the July 2005 Bureau of Economic Analysis release by the Department of Commerce it was stated that, "The trade deficit for the month of May 2005—one month—was \$55.3 billion—more than the entire year in 1984".

The other key financial repercussion of the dependence on oil as it relates to dollars also hits U.S. citizens and consumers in the wallet through taxes: taxes needed for the military.

Slow to Respond

Excerpted from "Jubak's Journal" (Jim Jubak), MSN Money Markets Editor, 7/9/2005

It makes immediate sense that oil supply will expand relatively slowly, despite higher oil prices.

What's harder to understand is why the run to \$60-a-barrel oil hasn't reduced demand.

Demand for oil and gasoline, the key product refined from oil, has kept rising as oil has become more expensive. For example, U.S. petroleum demand grew at an annualized 3.3% rate in May, about double the February growth rate. The Energy Department shows that total distillate demand, which includes jet fuel, heating oil, diesel fuel and gasoline, was 7% higher in the most recent four-week period than it was a year ago. U.S. gasoline consumption climbed 2.5% in the four weeks ended June 17 from the same period in 2004. This came despite the fact that the average price of a gallon of unleaded gasoline was \$2.23 in the week ending July 4, up 13 cents since the end of May.

And the phenomenon of rising demand in the face of rising prices isn't limited to the U.S.: The International Energy Agency has upped its forecast for world oil demand growth to 2.2% from 1.8%.

Why steep prices fail to dent demand

What's driving this seemingly perverse response to higher oil and gasoline prices? Take a look at these three reasons that explain, in my opinion, why higher prices haven't yet depressed demand.

1) The rise in energy prices follows a decade of depressed prices. In that period, the price of everything from a movie ticket to college tuition rose faster than energy prices. On an inflation-adjusted basis, oil and gas prices aren't that high. They're still playing catch-up.

2) Behavior changes more slowly than you'd think. Gas costs 13 cents a gallon more? Well, you've still got to drive to work, run the kids to their soccer games and do the weekly shopping run to Wal-Mart. What's the alternative? Public transportation? Ever take a bus in Los Angeles or try to get from Silver Spring, Md., to Falls Church, Va., on Washington's Metro? Buy a new car that gets better mileage? Tempting, but forking \$20,000 to \$40,000 to beat a 13-cents-a-gallon increase or even negotiating a new auto lease seems extreme. Maybe gas prices will fall again.

3) Much of the growth in demand is coming from consumers in China, India and other developing economies who are sheltered from the true world price of oil by domestic subsidies. Indonesia, which has moved from being a net

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Ethanol and Biofuels as a Replacement for Oil

As noted, the U.S. has the technology, capital, infrastructure, and government support in place to develop non-petroleum sources of energy. It should be understood that no rational energy strategy should start from the premise that we are going to *replace* oil. That simply is not going to happen. The sheer volume of our reliance on oil to fuel our transportation system makes that impossible. Plus, the petroleum industry has provided the United States with a comprehensive, efficient, and reliable distribution system that gives us the very mobility we seek. Therefore, any alternatives should be viewed in terms of their ability to augment the existing system. In the case of ethanol, there is a reason it is the "last man standing" in the alternative fuels race of the 1990s. Ethanol extends our petroleum supplies within the existing auto and refueling infrastructure.

When we talk about energy security, national security and economic security, ethanol is part of all of these, but not all of any one of them. It's a piece of the puzzle, but a key piece.

Provisions in the new federal energy legislation passed in July 2005 will result in an increase in domestic ethanol use that will reduce U.S. oil imports by 80,000 barrels per day. At current oil prices, ethanol would keep close to a half million U.S. dollars here, at home, every single day.

In future Issue Briefs, we will examine the impact of keeping these dollars at home and how ethanol is revitalizing the rural economy as well as reaching states beyond the Midwest.

The costs of maintaining a presence in the Persian Gulf are all too real.

Since 1949, U.S. interests and objectives in the region have included maintaining the uninterrupted flow of Persian Gulf oil, ensuring the security of Israel, and promoting a comprehensive resolution of the Arab-Israeli conflict.

The 1990 Persian Gulf War provided the United States with first hand experience of the cost of protecting oil supplies associated with an escalated military conflict in the Middle East. "The original intent of Saddam Hussein," said Senator John Glenn (R-OH) in 1990, "was to take over 70% of the world's known oil reserves. That would give him control over much of the energy for the whole industrialized world."

The energy security cost to the U.S. of maintaining the uninterrupted flow of oil from this area is approximately \$50 billion per year, and depending on various assumptions in several studies, can make the true cost of oil, counting military and energy security expenses, as high as \$100-\$150 per barrel.

A study by the National Defense Council Foundation (NDCF) in 2003 provides the most in-depth examination of this subject since the 1987 study by the General Accounting office, which was prior to the first Gulf War. The NDCF study found that America spends \$49.1 billion defending Persian Gulf oil, adding more than one dollar to the cost of a gallon of gasoline.

Sources:

<http://www.gao.gov/archive/1997/rc97006.pdf>

http://www.eia.doe.gov/pub/oil_gas/petroleum/data_publications/company_level_imports/current/import.html

<http://www.ensec.org/>

<http://www.marketwatch.com/news/story.asp?guid={86EF19EE-4318-4313-8450-7EAC57E48D28}&siteid=google&dist=google&cbsReferrer=>

<http://www.foxnews.com/story/0,2933,100343,00.html>

http://www.eere.energy.gov/vehiclesandfuels/facts/favorites/fcvt_fotw246.shtml

<http://api-ec.api.org/filelibrary/May03imp.pdf>

<http://www.setamericafree.org/loudobbs032105.pdf>

<http://www.ndcf.org/>

http://pubs.wri.org/pubs_content_text.cfm?ContentID=2153

<http://www.iags.org/n0813043.htm>

The study further concluded that the overall economic toll of this dependence on foreign oil is staggering. The diversion of capital and investment resulting from spending nearly \$100 billion annually on foreign oil, i.e. money that would otherwise be spent in the U.S., costs the U.S. economy more than 800,000 jobs per year, and costs federal, state and local government treasuries \$13.4 billion in lost revenues.

A National Defense Council Foundation study found that when taken together, the economic losses, the defense costs, and oil supply distribution costs bring the total cost of imported oil to approximately \$250 billion per year, or close to \$4.00 per gallon over the current purchase prices of gasoline.

"Failure to meet increasing energy demand with increased energy supplies, and vulnerability to disruptions from natural or malevolent causes, could threaten our nation's economic prosperity, alter the way we live our lives, and threaten our national security."

Secretary of Energy Spencer Abraham, March 20, 2003

<http://washingtontimes.com/commentary/20030722-093718-6082r.htm>

<http://www.iags.org/oiltransport.html>

Ethanol Fact Book

For more information please visit the following sites.

Ethanol Across America
<http://www.ethanolacrossamerica.net>

Clean Fuels Development Coalition
<http://www.cleanfuelsdc.org>

Nebraska Ethanol Board
<http://www.ne-ethanol.org>

American Coalition for Ethanol
<http://www.ethanol.org>

Nebraska Public Power District
<http://www.nppd.com>

oil exporter to an oil importer in the last year, will subsidize its oil refiners to the tune of about \$4.3 billion this year. In India, the state-owned oil companies have simply swallowed much of the recent price increase in gasoline, propane and kerosene. Total losses from that freeze are estimated at \$2.7 billion in the 12 months that ended in March. Gasoline in China sells for below global prices, and the country has kept diesel fuel prices fixed out of a fear of hurting farmers.

Some of these demand-side factors have started to change in recent months. Fuel subsidies in Indonesia had become so expensive that the government raised gasoline and diesel prices by 30% in April, which will cut the size of the government subsidy to \$4.3 billion in 2005 from \$6.4 billion in 2004. China is introducing its first fuel-efficiency standards for cars in an effort to discourage SUV purchases. In the U.S., consumers faced with higher prices at the pump have scaled back purchases of SUVs.

Waiting for a meaningful reduction

But these are just the beginning of a demand-side response to higher fuel prices, and it'll take more time and higher prices before we see a meaningful reduction in the oil and gas demand.

How much higher and how long? The Bank for International Settlements has projected that, thanks to the increased energy efficiency of some of the world's economies and the shift from an energy-intensive manufacturing economy in the U.S. to a service-oriented economy, it might take \$75-a-barrel oil to put a serious nick in global demand. Cambridge Energy Associates, which believes that higher oil production will push prices back toward \$40 a barrel, pegs the increase in production and falling prices for 2007-2008.

Both projections argue for higher-than-current oil prices through 2005 and certainly well into 2006.

Mind you, these are relatively short-term trends I'm talking about here. A drop to \$40, even if it occurs, still leaves oil prices well above the \$10- to \$20-a-barrel lows before this run-up began. In other words, \$40 would become the new floor for the next multi-year move higher.

How much higher and when depends on whether you think global oil production has peaked or when it will peak. On this one, I think the oil bears are the most useful guide. Cambridge Energy Associates basically pooh-poohs the belief that oil production has peaked and thinks those who put the peak in 2008 are just slightly less misguided.

But they still believe we're within shouting distance of a production peak. They put it in 2020.



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